

# DELIMINATOR

## PRODUCT INFORMATION

• Cleans Irrigation System • Increases Water Penetration in Soil

### BIODEGRADABLE

### For Alkaline, Calcareous, Sodic, Natric Soil

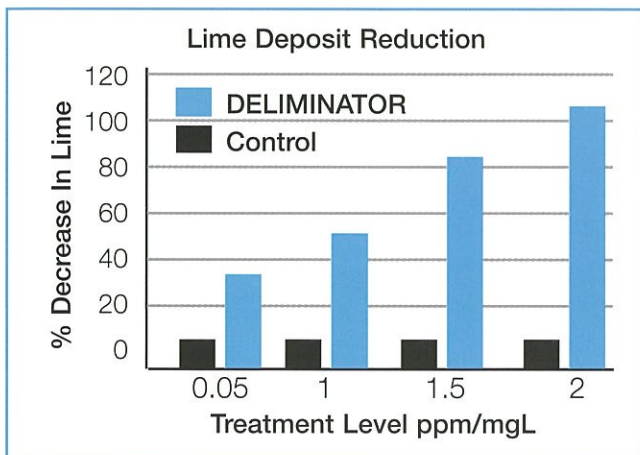
- Cleans irrigation system of lime and bicarbonate.
- Increases Calcium and Magnesium availability for plants.
- Stops lime build up in hard and reclaimed water.
- Non-Corrosive.

DELIMINATOR'S unique organic carboxyl-amino molecule acts like a chelating agent, that is highly effective at increasing water penetration into the soil and reducing hard water deposits in irrigation lines emitters and equipment. Stopping the formation of lime in hard water shifts the water chemistry equilibrium to free Calcium and Magnesium.

DELIMINATOR works at very low concentration 1/2 to 5 ppm (mg/L) to control both Calcium and Magnesium levels in a wide range of water pH, hardness, turbidity and composition.

#### SPECIAL FEATURES:

- Stop Lime Formation
- Frees up and Stabilizes Ca & Mg
- Control Deposits in Hard Water
- Disperses Existing Deposits
- Functional Over Wide pH Range
- Superior Value-Cost plus Efficacy.
- Eliminates use of Feed Acids or Working with Corrosives to Lower pH.



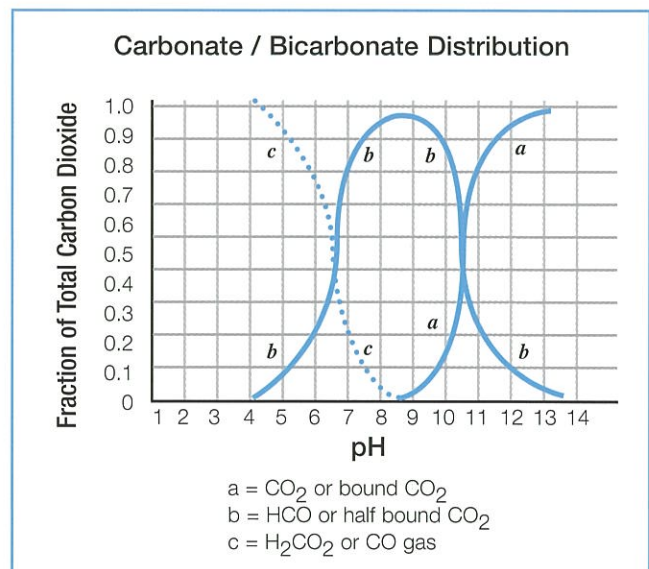
Lime and other inorganic solids form in hard water with a variety of other ions, the addition of Deliminator in hard water, effectively increases the solubility of lime and Magnesium.

Calcium may be present in water as  $Ca^{2+}$ , Calcium Carbonate  $Ca(HCO_3)^+$  or Calcium Hydroxide  $Ca(OH)^+$ . Magnesium usually presents itself also in a variety of ionic forms  $Mg^{2+}$  or Magnesium Carbonate  $Mg(HCO_3)^+$ . Other metal ions also take part in this reaction such as Iron as  $Fe(H_2O)_6^{+3}$  or Ferrous Carbonate  $FeCO_3$

In all these examples, insoluble compounds form binding up Calcium and clogging irrigation lines and equipment.

#### Functional Over Wide pH Range

Water chemistry is complicated, Deliminator solves scale and lime problems with a unique chemistry known as the tri carboxyl threshold effect.



Effect of changing pH on distribution of different  $CO_2$  related ions in solution.



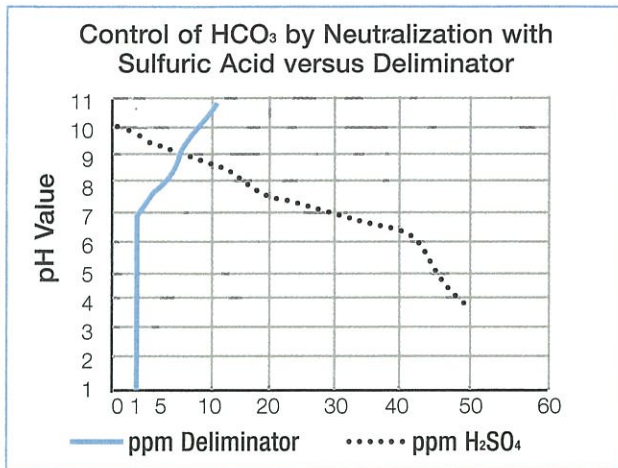
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The tri-carboxyl groups in Delimitator have demonstrated a multifunctional mechanism in their ability to maintain solubility of otherwise insoluble salts beyond their normal limits, and over a wide pH range (pH 2 -12) keeping Calcium in solution and available to the plant.

Most acids (Sulfuric, Citric & Phosphoric) and chelating agents can sequester calcium at a molar ratio of about 2:1. Depending on irrigation water pH levels Delimitator will control calcium at a molar ratio of 1:20 or more. This clearly demonstrates a mechanism of superior performance and efficiency above and beyond acid treatment of irrigation water.

## Acid Neutralized pH vs. DELIMINATOR

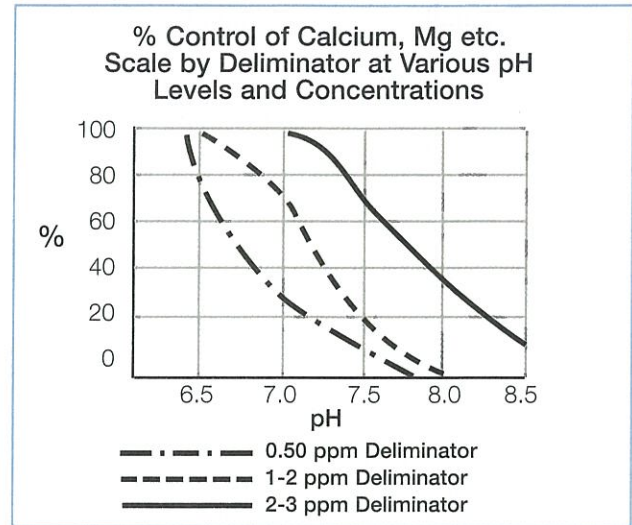
Alkaline and hard water can be neutralized with Sulfuric Acid ( $H_2SO_4$ ). The equivalent weights (molar weight) of Calcium Carbonate and Sulfuric Acid are nearly equal. One unit of acid will react with an equal quantity of Calcium Carbonate.



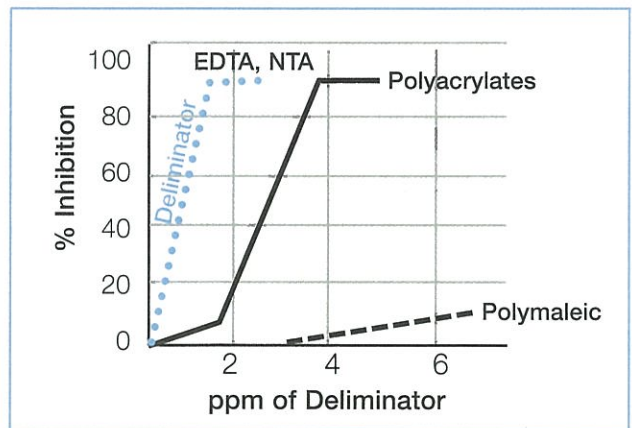
Due to the DELIMITATORS, threshold effect significantly more metal ions, Ca, Mg, Fe, etc. can be controlled than would be stoichiometrically required of acid only.

Delimitator's threshold effect offers the best value. cost and efficacy choice when comparing cost performance versus cost per pound treatment.

In many cases the higher cost product is actually the most economical product when costs are calculated on the final diluted working gallon efficiency basis.



Slightly less than 2 ppm of Delimitator effectively inhibited lime scale formation in irrigation water containing 612 ppm Ca, Mg &  $RCO_3$  at pH 8.4. Typical sequestering chelating agents such as EDTA, NTA and Polymaleic Acid do not control scale at threshold levels.



## SUMMARY:

- Delimitator's unique tri carboxyl amino chemistry with performance threshold effect.
- Stops lime formation in hard water and protects irrigation equipment, allowing Calcium and Magnesium to be plant available.
- Solves the problems associated with high bicarbonate and re-claimed water.